



Microcontrollers(4rd year)

Sheet 9

Answer the following questions:

(Q1) Write a program in which every 2 seconds, the LED connected to P2.7 is turned on and off four times, while at the same time the 8051 is getting data from P1 and sending it to P0 continuously. Make sure the on and off states are 50 ms in duration.

(Q2) Assume that the IE bit for external hardware interrupt EX0 is enabled and is low-level triggered. Explain how this interrupt works when it is activated. How can we make sure that a single interrupt is not interpreted as multiple interrupts?

(Q3) Write a program using interrupts to get data from P1 and send it to P2 while Timer 0 is generating a square wave of 3 kHz.

(Q4) Write a program using interrupts to get data from P1 and send it to P2 while Timer 1 is turning on and off the LED connected to P0.4 every second.

(Q5) Write a C program that continuously gets a single bit of data from P1.5 and sends it to P1.6, while simultaneously creating a square wave of 200 μ s period on pin P2.5. Use Timer 1 to create the square wave.

(Q6) Write a C program using interrupts (set the baud rate at 4800) to do the following:

- **Receive data serially and send it P1**
- **Read port P2, transmit data serially, and give a copy to P1**
- **Make Timer 1 generate a square wave of 7 kHz frequency on P0.7**

(Q7) Write a C program using interrupts to do the following:

- **Generate a 15 kHz frequency on P2.3 using Timer 0 8-bit auto reload**
- **Use Timer 1 as an event counter to count up a 1 Hz pulse and display it on P1.**